

Solar Enhanced North Sea Energy Hub

Publieke samenvatting / Public summary

Aanleiding

SENSE-Hub accelerates the potential rollout of offshore floating solar into offshore renewable energy systems. Carbon reduction strategies in the Netherlands include a large and critical role for applications at sea. The future offshore energy system is envisioned to consist of wind turbines, platforms with electrolyzers, power export cables, and pipelines to transport green hydrogen. The addition of offshore floating solar can be of critical importance for the feasibility of the offshore energy system. Firstly, offshore solar allows for additional energy generation without additional spatial requirements. Secondly, it presents rewarding system integration opportunities as the energy patterns of solar and wind are complementary. This allows integration of large amounts of solar on the same electrical infra structure as the wind farms with negligible curtailment. This may result in 1) increased utilization of power infrastructure and more efficient conversion which will result in a lower cost of the green hydrogen produced; 2) diversification of energy sources to de-risk revenue models; 3) possible increase of operational lifetime of electrolyzers from more stable operations.

Doelstelling

The goal of the SENSE Hub project is to develop an understanding of the merits/challenges for enhancing North Sea energy systems with a second, complementary energy generation source (offshore solar). SENSE-Hub addresses the integration of various energy system modules and the validation of the concept by focusing on the technical, economic, ecological, and legal implications. The

Projectinformatie / Project information

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MOOI622002

Subsidiebedrag / Grant amount

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Algemene informatie / General information

Penvoerder / Secretariat

Nederlandse Organisatie voor
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Publicaties en materialen / Publications and attachments

- 22.05.2024

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Voortgangsrapportage 1

- 04.03.2025

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Voortgangsrapportage 2

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SENSE-Hub concept validation is approached from different angles and dimensions: small scale (kW) testing at SWITCH Lab TNO, offshore testing of the solar and wind profiles at 1 MW electrolyser at Neptune Q13a, and offshore at MW-scale at the NS2 offshore solar farm, and using the inputs to predict behaviour and optimize economics on a GW scale through extensive modelling efforts.

Korte omschrijving

The project activities will support the development of the results. To improve technical reliability of offshore solar technology, the team will design, engineer, install and operate the additional optimized floaters. For understanding the environmental impacts, field data will be collected, multiple models developed and validated. To identify the optimal system integration of the SENSE Hub, the team will work in multiple dimensions, from scenario development to running extensive tests in the SWITCH Lab. Next to this, the solar and wind profiles will be implemented in the existing PosHYdon assets and data collected and analysed. The models developed will be validated with field data and used to study SENSE Hub at GW-scale. Next to this, research on legal regulatory framework will be conducted. Extensive stakeholders engagement and dissemination activities will be performed.

Resultaat

The project aims to understand and remove the implementation barriers for future SENSE-Hubs from a technical, economical, ecological, legal and societal perspective by targeting:

- Improved technical reliability and cost reduction of offshore solar technology by applying the lessons from modelling and from operations, and validate the optimized system by expanding the floating solar park developed in NS2
- Understand environmental impacts of offshore solar (in wind farms) to enable policy making and responsible future developments
- Propose optimal system integration of the offshore energy system modules (wind, solar, storage, hydrogen production, power export, hydrogen export) based on modelling and extensive

experimental tests in TNO facilities - Enable SENSE
Hub applications from the legal perspective with the
development of an accompanying legal &
contractual framework - Remove barriers for GW-
scale implementation in a technical study, using
MW-scale piloted concept

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in
samenwerking met de Topsector Energie ontsloten.

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